IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Phan et al.
Appl. No.	:	10/087,549
Filed	:	February 28, 2002
For	:	METHODS FOR DECREASING NON-SPECIFIC BINDING OF BEADS IN DUAL BEAD ASSAYS INCLUDING RELATED OPTICAL BIODISCS AND DISC DRIVE SYSTEMS
Examiner	:	Ethan Whisenant
Group Art Unit	:	1634

RESPONSE TO RESTRICTION REQUIREMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Dear Sir:

This communication is in response to the Office Action mailed December 19, 2003. The Examiner has required restriction to one of six inventions, namely:

Group I – Claims 1, 7, 9 and 11.

Group II – Claims 1 and 13.

Group III – Claims 3 and 5.

Group IV – Claims 2, 4, 6, 8, 10 and 12.

Group V – Claims 2 and 14.

Group VI – Claim 15.

Applicants hereby elect, without traverse, to prosecute Claims 1, 7, 9 and 11 directed to Group I, classified in Class 435, Subclass 6, in the present application. Applicants understand that Claim 1 is a broad generic claim encompassing both a hybridization assay and/or an antigen-antibody binding assay. Please withdraw Groups II, III, IV, V and VI (Claims 2-6, 8, 10, 12-15) without prejudice. Applicants reserve the right to pursue the nonelected claims in one or more continuing applications.

1. (Original) A method for identifying whether a target agent is present in a biological sample, the method comprising the steps of:

preparing a plurality of capture beads pre-treated with a bead blocking agent, each of said capture beads having at least one transport probe affixed thereto;

preparing a plurality of reporter beads pre-treated with the bead blocking agent, each of said reporter beads having at least one signal probe affixed thereto;

mixing said capture beads and said reporter beads under binding conditions so as to permit formation of a dual bead complex if said target agent is present in the sample, the reporter bead and capture bead each being bound to the target agent;

isolating the dual bead complex from the mixture to obtain an isolate; exposing the isolate to a capture field on an optical bio-disc, the capture field having a capture agent that binds to the dual bead complex; and

detecting the presence of the dual bead complex in the disc to indicate that the target agent is present in the sample.

2. (Withdrawn) The optical bio-disc as used in conjunction with the method recited in claim 1.

3. (Withdrawn) A method of preparing a dual bead assay for use in an optical bio-disc, said method comprising the steps of:

providing a mixture of capture beads that have transport probes covalently bound thereto;

providing a mixture of reporter beads that have signal probes covalently bound thereto;

blocking said mixture of capture beads with a bead blocking agent;

blocking said mixture of reporter beads with said bead blocking agent;

suspending said mixture of capture beads in a hybridization solution;

adding to said mixture a target agent that hybridizes with said transport probes;

adding to said mixture said reporter beads;

allowing said signal probes to hybridize with said target agent to thereby form a dual bead complex including at least one capture bead and one reporter bead;

separating said dual bead complex from unbound reporter beads;

removing from said mixture said unbound reporter beads; and

loading said mixture including said dual bead complex into an optical bio-disc for analysis.

4. (Withdrawn) The optical bio-disc as used in conjunction with the method recited in claim 3.

5. (Withdrawn) A method of preparing a dual bead assay for use in an optical bio-disc, said method comprising the steps of:

providing a mixture of capture beads having transport probes covalently attached thereto;

providing a mixture of reporter beads that have signal probes covalently bound thereto;

blocking said mixture of capture beads with a bead blocking agent;

blocking said mixture of reporter beads with said bead blocking agent;

suspending said mixture of capture beads in a hybridization solution;

adding to said mixture a target agent that hybridizes with said transport probes;

allowing said transport probes to hybridize with said target agent to thereby form a hybridized partial complex including at least one capture bead;

separating within said mixture said hybridized partial complex from unbound target agents;

adding to said mixture reporter beads including signal probes covalently attached thereto;

allowing said signal probes to hybridize with said target agent to thereby form a dual bead complex including at least one capture bead and one reporter bead;

separating said dual bead complex from unbound reporter beads;

removing from said mixture said unbound reporter beads; and

loading said mixture including said dual bead complex into an optical bio-disc for analysis.

6. (Withdrawn) The optical bio-disc as used in conjunction with the method recited in claim 5.

7. (Original) A method of testing for the presence of a target-DNA in a DNA sample by use of an optical bio-disc, said method comprising the steps of:

preparing a DNA sample to be tested for the presence of a target-DNA;

preparing a plurality of reporter beads each having covalently attached thereto a plurality of strands of signal-DNA and an anchor agent, the target-DNA and the signal-DNA being complementary;

preparing a plurality of capture beads each having covalently attached thereto a plurality of transport-DNA, the target-DNA and transport-DNA being complimentary;

blocking said plurality of reporter beads and said plurality of capture beads with a bead blocking agent;

mixing said DNA sample, said plurality of reporter beads, and said plurality of capture beads to thereby form a test sample, the transport-DNA and the signal-DNA being non-complimentary;

allowing hybridization between said signal-DNA, any target-DNA, and transport-DNA existing in the DNA sample to thereby form a dual bead complex including at least one capture bead and one reporter bead;

removing from the test sample reporter beads and capture beads that are not associated with the dual bead complex;

depositing said test sample in a flow channel of an optical bio-disc which is in fluid communication with a target zone, the target zone including a plurality of capture agents each including an amino group that attaches to an active layer to immobilize the capture agents within the target zone;

allowing any anchor agent to bind with the capture agents so that reporter beads associated with the dual bead complex are maintained within the target zone; and

detecting any dual bead complexes in the target zone to thereby determine whether target-DNA is present in the DNA sample.

8. (Withdrawn) The optical bio-disc as used in conjunction with the method recited in claim 7.

9. (Original) A method of testing for the presence of a target-DNA in a test sample by use of an optical bio-disc, said method comprising the steps of:

preparing a test sample to be tested for the presence of a target-DNA;

preparing a plurality of reporter beads each having covalently attached thereto a plurality of strands of signal-DNA, the target-DNA and the signal-DNA being complementary;

preparing a plurality of capture beads each having covalently attached thereto a plurality of transport-DNA and an anchor agent, the target-DNA and transport-DNA being complimentary;

blocking said plurality of reporter beads and said plurality of capture beads with a bead blocking agent;

depositing a plurality of capture beads and reporter beads in a mixing chamber, each of said reporter beads and said capture beads including signal-DNA and transport-DNA, respectively, being non-complimentary to each other;

depositing said test sample in the mixing chamber of an optical bio-disc which is linked to a target zone by a connecting flow channel allowing any target- DNA existing in the test sample to bind to the signal-DNA and the transport-DNA on the reporter and the capture bead, respectively, to thereby form a dual bead complex;

rotating the optical bio-disc to cause the dual bead complex to move from the mixing chamber through the flow channel and into the target zone, the target zone including a plurality of capture agents each including an amino group that attaches to an active layer to immobilize the capture agents within the target zone, said capture agent having affinity for the anchor agent;

allowing any anchor agent to bind with the capture agent so that capture beads associated with dual bead complex are maintained within the capture zone;

removing from the target zone reporter beads that are free of any dual bead complex; and

detecting any dual bead complex in the target zone to thereby determine whether target-DNA is present in the test sample.

10. (Withdrawn) The optical bio-disc as used in conjunction with the method recited in claim 9.

11. (Original) A method of testing for the presence of a target-RNA in a test sample by use of an optical bio-disc, said method comprising the steps of:

preparing a test sample to be tested for the presence of a target-RNA;

preparing a plurality of reporter beads each having covalently attached thereto a plurality of strands of signal-DNA, the target-RNA and the signal-DNA being complementary;

preparing a plurality of capture beads each having covalently attached thereto a plurality of transport-DNA and an anchor agent, the target-RNA and transport-DNA being complimentary;

blocking said plurality of reporter beads and said plurality of capture beads with a bead blocking agent;

depositing a plurality of capture beads and reporter beads in a mixing chamber, each of said reporter beads and capture beads including the signal-DNA and the transport-DNA, respectively, being non-complimentary to each other;

depositing said test sample in the mixing chamber of an optical bio-disc which is linked to a target zone by a connecting flow channel allowing any target- RNA existing in the test sample to hybridize with the signal-DNA and the transport- DNA on the reporter and the capture bead, respectively, to thereby form a dual bead complex;

rotating the optical bio-disc to cause the dual bead complex to move from the mixing chamber through the flow channel and into the target zone, the target zone including a plurality of capture agents each including an amino group that attaches to an active layer to immobilize the capture agents within the target zone, said capture agent and said anchor agent having affinity to each other;

allowing any anchor agent to bind with the capture agent so that capture beads associated with dual bead complex are maintained within the capture zone;

removing from the target zone reporter beads that are free of any dual bead complex; and

detecting any dual bead complex in the target zone to thereby determine whether target-RNA is present in the test sample.

12. (Withdrawn) The optical bio-disc as used in conjunction with the method recited in claim 11.

13. (Withdrawn) A method of testing for the presence of a target-antigen in a test sample by use of an optical bio-disc, said method comprising the steps of:

preparing a test sample to be tested for the presence of a target-antigen;

preparing a plurality of reporter beads each having covalently attached thereto a plurality of signal-antibody, the signal-antibody having an affinity to epitopes on the target-antigen;

preparing a plurality of capture beads each having covalently attached thereto a plurality of transport-antibody and an anchor agent, the transport-antibody having affinity to epitopes on the target-antigen;

blocking said plurality of reporter beads and said plurality of capture beads with a bead blocking agent;

depositing the capture beads and the reporter beads in a mixing chamber of an optical bio-disc, each of said reporter beads and capture beads including the signal-antibody and the transport-antibody, respectively, having no affinity to each other;

depositing said test sample in the mixing chamber of said optical bio-disc which is linked to a target zone by a connecting flow channel allowing any target- antigen existing in the test sample to bind to the signal-antibody and the transport- antibody on the reporter and the capture bead, respectively, to thereby form a dual bead complex;

rotating the optical bio-disc to cause the dual bead complex to move from the mixing chamber through the flow channel and into the target zone, the target zone including a plurality of capture agents each including an amino group that attaches to an active layer to immobilize the capture agents within the target zone;

allowing any anchor agent to bind with the capture agent so that capture beads associated with dual bead complex are maintained within the capture zone;

removing from the target zone reporter beads that are free of any dual bead complex; and

detecting any dual bead complex in the target zone to thereby determine whether target-antigen is present in the test sample.

14. (Withdrawn) The optical bio-disc as used in conjunction with the method recited in claim 13.

15. (Withdrawn) A method of making an optical bio-disc to test for the presence of a target agent in a test sample, the method comprising the steps of:

providing a substrate having a center and an outer edge;

encoding information on an information layer associated with the substrate, the encoded information being readable by a disc drive assembly to control rotation of the disc;

forming a target zone in association with the substrate, the target zone disposed at a predetermined location relative to the center of the substrate;

depositing an active layer in the target zone;

depositing a plurality of capture agents in the target zone, each capture agent including an amino group that covalently attaches to the active layer to immobilize the capture agent within the target zone;

blocking said target zone with a plurality of blocking agents after depositing said capture agents;

forming a flow channel in fluid communication with the target zone;

forming a mixing chamber in fluid communication with the flow channel;

depositing a plurality of reporter beads in the mixing chamber, each of the reporter beads having covalently attached thereto a plurality of signal probes, each of the signal probes having affinity to the target agent;

depositing a plurality of capture beads in the mixing chamber, each of the capture beads having covalently attached thereto a plurality of transport probes and an anchor agent, each of the transport probes having affinity to the target agent, the transport probes and signal probes having no affinity toward each other, and the capture agents and the anchor agents having specific

affinity to each other; and adding a pre-determined amount of bead blocking agent to the mixing chamber to prevent non-specific binding of the beads to each other and the walls of the mixing chamber.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 3/18/04

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